

WHAT IS CLAIMED IS:

1. An isolated nucleic acid molecule comprising a nucleotide sequence that encodes a SCARECROW protein  
5 containing an amino acid sequence substantially similar to the sequence of MOTIF III (VHIID) of Arabidopsis SCR protein shown in FIGS. 13A-F.
2. An isolated nucleic acid molecule comprising (a) a  
10 nucleotide sequence that encodes a scarecrow protein having the amino acid sequence of SEQ ID NO:2, SEQ ID NO:19, SEQ ID NO:21, SEQ ID NO:23, SEQ ID NO:34, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:46, SEQ ID NO:48, SEQ ID  
15 NO:50, SEQ ID NO:52, SEQ ID NO:54, SEQ ID NO:56, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:61, SEQ ID NO:63, SEQ ID NO:65, SEQ ID NO:67 or the amino acid sequence shown in FIG. 25, FIG. 28AB, FIG. 28AC, FIG. 28AD, FIG. 28AE, FIG. 28AF, FIG. 28AG or FIG. 28AH; or (b) the complement of the  
20 nucleotide sequence of (a). C
3. An isolated nucleic acid molecule comprising a nucleotide sequence that hybridizes to the nucleic acid of Claim 2 and encodes a naturally occurring SCR gene product.  
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4. A nucleic acid molecule comprising (a) a nucleotide sequence that encodes a SCR protein lacking one to four of the following motifs delineated in FIGS. 13A-F: MOTIF I, MOTIF II, MOTIF III, MOTIF IV, MOTIF V, or MOTIF VI; or (b)  
30 the complement of the nucleotide sequence of (a).
5. A nucleic acid molecule comprising (a) a nucleotide sequence that encodes a polypeptide corresponding to MOTIF I, MOTIF II, MOTIF IV, MOTIF V or MOTIF VI of the SCARECROW  
35 protein delineated in FIGS. 13A-F; or (b) the complement of the nucleotide sequence of (a).

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6. The isolated nucleic acid molecule of Claim 1 comprising the nucleic acid sequence of SEQ ID NO:1, SEQ ID NO:18, SEQ ID NO:20, SEQ ID NO:22, SEQ ID NO:45, SEQ ID NO:47, SEQ ID NO:49, SEQ ID NO:51, SEQ ID NO:53, SEQ ID NO:55, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:62, SEQ ID NO:64, SEQ ID NO:66 or the nucleic acid sequence shown in FIG. 25, FIG. 28A, FIG. 28B, FIG. 28C, FIG. 28D, FIG. 28E, FIG. 28F, FIG. 28G, FIG. 28H, FIG. 28I, FIG. 28J, FIG. 28K, FIG. 28L, FIG. 28M, FIG. 28N, FIG. 28O, FIG. 28P, FIG. 28Q, FIG. 28R, FIG. 28S, FIG. 28T, FIG. 28U, FIG. 28V, FIG. 28W, FIG. 28X, FIG. 28Y, FIG. 28Z or FIG. 28AA.
7. A DNA vector containing the nucleic acid molecule of Claim 1, 2, 3, 4, 5, or 6.
8. An expression vector containing the nucleic acid molecule of Claim 1, 2, 3, 4, 5, or 6 operatively associated with a regulatory sequence containing transcriptional and translational regulatory elements that control expression of the nucleotide sequence in a host cell.
9. A genetically-engineered host cell containing the nucleic acid molecule of Claim 1, 2, 3, 4, 5, or 6.
10. A genetically-engineered host cell containing the nucleic acid molecule of Claim 1, 2, 3, 4, 5, or 6 operatively associated with a regulatory sequence containing transcriptional and translational regulatory elements that control expression of the nucleotide sequence in a host cell.
11. An isolated SCARECROW protein.
12. The protein of Claim 11 having the amino acid sequence shown in FIG. 25.

13. A SCARECROW protein lacking one to four of the following motifs delineated in FIGS. 13A-F: MOTIF I, MOTIF II, MOTIF III, MOTIF VI, MOTIF V, or MOTIF VI.
- 5 14. A polypeptide corresponding to MOTIF I, MOTIF II, MOTIF IV, MOTIF V or MOTIF VI of the SCARECROW protein as delineated in FIGS. 13A-F.
15. An antibody that immunospecifically binds the protein or  
10 polypeptide of Claim 11, 12, 13 or 14.
16. An anti-idiotypic antibody that mimics an epitope of SCARECROW protein.
- 15 17. A plant genetically-engineered to overexpress or underexpress a SCARECROW protein or polypeptide, so that cell division is modified, and root and/or stem development is altered.
- 20 18. A plant genetically-engineered to overexpress a SCARECROW protein or polypeptide, so that cell division is increased in roots, resulting in thicker root development.
19. A transgenic plant containing a transgene having the  
25 nucleic acid molecule of Claim 1, 2, 3, 4, 5, or 6.
20. A transgenic plant containing a transgene having the nucleic acid molecule of Claim 1, 2, 3, 4, 5, or 6 operatively associated with a regulatory sequence containing  
30 transcriptional and translational regulatory elements that control expression of the nucleotide sequence in a transgenic plant cell.
21. The transgenic plant of Claim 19, in which the transgene  
35 encodes an antisense nucleotide sequence that suppresses expression of endogenous SCARECROW gene product, so that cell

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division is decreased in roots, resulting in thinner root development.

22. A genetically-engineered plant in which the endogenous  
5 SCARECROW gene is disrupted or inactivated so that cell  
division is decreased in roots, resulting in thinner root  
development.

23. A transgenic plant containing a transgene encoding a  
10 gene of interest operatively associated with a SCARECROW  
promoter, so that the gene of interest is expressed in a  
tissue-specific manner in roots or embryos.

24. The transgenic plant of Claim 23, in which the gene of  
15 interest encodes a gene product that confers herbicide, salt,  
pathogen, or insect resistance.

25. A transgenic plant containing a transgene encoding a  
20 gene of interest operatively associated with a SCARECROW  
promoter, so that the gene of interest is expressed in  
shoots.

26. The transgenic plant of Claim 25, in which the gene of  
25 interest encodes a gene product that increases starch, lignin  
or cellulose biosynthesis.

27. A plant genetically-engineered to overexpress or  
underexpress the SCARECROW protein so that gravitropism of  
30 the stem or hypocotyl is altered.

28. The plant of Claim 27, which is less susceptible to  
lodging than a wild-type plant.

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